CLAIMS

1. (Currently Amended) ~~Peptide vector~~ A composition for transfecting a chemical substance selected from the group consisting of nucleic acid sequences, proteins, peptides and pharmacologically active chemical substances, characterized in that it ~~contains~~ consists essentially, in addition to the said chemical substance, of at least one transfecting peptide derived from the whole or part of a fibre of an adenovirus selected from the group consisting of Ad2, Ad3, Ad4, Ad7, Ad8, Ad9, Ad11, Ad12, Ad15, Ad16, Ad21, Ad40, Ad41, FAV1 (CELO) and FAV7, which transfecting peptide comprises at least:

- a segment of an NLS sequence derived from an adenovirus fibre comprising between 4 and 5 amino acids and including a sequence selected from the group consisting of the following sequences: X_0-Lys-Arg-Val-Arg (X_0KRVR) (SEQ ID NO:1), X_0-Lys-Arg-Ala-Arg (X_0KRAR) (SEQ ID NO:2), X_0-Lys-Arg-Ser-Arg (X_0KRSR) (SEQ ID NO:3), X_0-Lys-Arg-Leu-Arg (X_0KRLR) (SEQ ID NO:4), X_0-Lys-Arg-Thr-Arg (X_0KRTR) (SEQ ID NO:5), X_0-Pro-Lys-Lys-Pro-Arg (X_0PKKPR) (SEQ ID NO:6), in which X_0 is zero or represents Thr (T), Ala (A), Ser-Lys (SK) or Ser (S), or a segment of the SV40 virus Vp3 protein ~~and in particular~~ consisting of the sequence GPNKKKRKL (SEQ ID NO:24),

- a hydrophobic sequence comprising between 7 and 50 amino acids, derived from an adenovirus fibre and selected from the group consisting of at least one of the following sequences X_1-Phe-Asn-Pro-Val-Tyr-Pro-Tyr-X_2 (X_1FNPVYPYX_2) (SEQ ID NO:7), X_1-Phe-Asp-Pro-Val-Tyr-Pro-Tyr-X_2 (X_1FDPVYPYX_2) (SEQ ID NO:8), in which:

X_1 is zero or represents a sequence of at most 43 amino acids ~~, preferably a sequence of 5 to 15 amino acids,~~ comprising hydrophobic and/or polar and/or

acidic charged amino acids ~~,~~ and ~~in particular~~ selected from the group consisting of one of the following sequences: Leu-Ser-Asp-Ser (LSDS) (SEQ ID NO:9), Leu-Ser-Thr-Ser (LSTS) (SEQ ID NO:10), Leu-Ser-Ser-Ser (LSSS) (SEQ ID NO:11), Pro-Ser-Glu-Asp-Thr (PSEDT) (SEQ ID NO:12), Val-Asp-Asp-Gly (VDDG) (SEQ ID NO:13), Thr-Gln-Tyr-Ala-Glu-Glu-Thr-Glu-Glu-Asn-Asp-Asp (TQYAEETEENDD) (SEQ ID NO:14) or X_3-Glu-Asp-Asp (X_3EDD) (SEQ ID NO:15) in which X_3 represents Ala (A), Val (V), Leu (L), Phe (F) or Ile (I) and

X_2 is zero or represents a sequence of at most 43 amino acids ~~, preferably a sequence of 5 to 15 amino acids,~~ comprising hydrophobic and/or polar and/or charged amino acids ~~,~~ and ~~in particular one~~ selected from the group consisting of the following sequences: Glu-Asp-Glu-Ser (EDES) (SEQ ID NO:16), Asp-Thr-Glu-Thr (DTET) (SEQ ID NO:17), Asp-Ala-Asp-Asn (DADN) (SEQ ID NO:18), Asp-Pro-Phe-Asp (DPFD) (SEQ ID NO:19), Gly-Tyr-Ala-Arg (GYAR) (SEQ ID NO:20), Glu-His-Tyr-Asn (EHYN) (SEQ ID NO:21), Asp-Thr-Ser-Ser (DTSS) (SEQ ID NO:22) or Asp-Thr-Phe-Ser (DTFS) (SEQ ID NO:23) and

- a polymeric sequence of basic amino acids or a cationic polymeric sequence or a polyalcohol ~~, for use as a medicament~~.

2. (Currently amended) ~~Peptide vector~~ A composition for transfecting a chemical substance selected from the group consisting of nucleic acid sequences, proteins, peptides and pharmacologically active chemical substances, characterized in that it ~~contains~~ consists essentially, in addition to the said chemical substance, of at least one transfecting peptide derived from the whole or part of a fibre of an adenovirus selected from the group consisting of Ad2, Ad3, Ad4, Ad7, Ad8, Ad9, Ad11, Ad12, Ad15, Ad16, Ad21, Ad40,

Ad41, FAV1 (CELO) and FAV7, which transfecting peptide comprises at least:

- a segment of an NLS sequence derived from an adenovirus fibre comprising between 4 and 5 amino acids and including a sequence selected from the group consisting of the following sequences: X_0-Lys-Arg-Val-Arg (X_0KRVR) (SEQ ID NO:1), X_0-Lys-Arg-Ala-Arg (X_0KRAR) (SEQ ID NO:2), X_0-Lys-Arg-Ser-Arg (X_0KRSR) (SEQ ID NO:3), X_0-Lys-Arg-Leu-Arg (X_0KRLR) (SEQ ID NO:4), X_0-Lys-Arg-Thr-Arg (X_0KRTR) (SEQ ID NO:5), X_0-Pro-Lys-Lys-Pro-Arg (X_0PKKPR) (SEQ ID NO:6), in which X_0 is zero or represents Thr (T), Ala (A), Ser-Lys (SK) or Ser (S), or a segment of the SV40 virus Vp3 protein [and in particular the sequence GPNKKKRKL (SEQ ID NO:24)],

- a hydrophobic sequence comprising between 7 and 50 amino acids, derived from an adenovirus fibre and selected from the group consisting of at least one of the following sequences X_1-Phe-Asn-Pro-Val-Tyr-Pro-Tyr-X_2 (X_1FNPVYPYX_2) (SEQ ID NO:7), X_1-Phe-Asp-Pro-Val-Tyr-Pro-Tyr-X_2 (X_1FDPVYPYX_2) (SEQ ID NO:8), in which:

X_1 is zero or represents a sequence of at most 43 amino acids ~~, preferably a sequence of 5 to 15 amino acids,~~ comprising hydrophobic and/or polar and/or acidic charged amino acids ~~, and in particular one~~ and selected from the group consisting of the following sequences: Leu-Ser-Asp-Ser (LSDS) (SEQ ID NO:9), Leu-Ser-Thr-Ser (LSTS) (SEQ ID NO:10), Leu-Ser-Ser-Ser (LSSS) (SEQ ID NO:11), Pro-Ser-Glu-Asp-Thr (PSEDT) (SEQ ID NO:12), Val-Asp-Asp-Gly (VDDG) (SEQ ID NO:13), Thr-Gln-Tyr-Ala-Glu-Glu-Thr-Glu-Glu-Asn-Asp-Asp (TQYAEETEENDD) (SEQ ID NO:14) or X_3-Glu-Asp-Asp (X_3EDD) (SEQ ID NO:15) in which X_3 represents Ala (A), Val (V), Leu (L), Phe (F) or Ile (I) and

X_2 is zero or represents a sequence of at most 43 amino acids, preferably a sequence of 5 to 15 amino acids, comprising hydrophobic and/or polar and/or

charged amino acids ~~, and in particular one~~ and selected from the group consisting of the following sequences: Glu-Asp-Glu-Ser (EDES) (SEQ ID NO:16), Asp-Thr-Glu-Thr (DTET) (SEQ ID NO:17), Asp-Ala-Asp-Asn (DADN) (SEQ ID NO:18), Asp-Pro-Phe-Asp (DPFD) (SEQ ID NO:19), Gly-Tyr-Ala-Arg (GYAR) (SEQ ID NO:20), Glu-His-Tyr-Asn (EHYN) (SEQ ID NO:21), Asp-Thr-Ser-Ser (DTSS) (SEQ ID NO:22) or Asp-Thr-Phe-Ser (DTFS) (SEQ ID NO:23), which transfecting peptide is combined with a polymeric sequence of basic amino acids, a cationic polymer or a polyalcohol ~~, for use as a medicament~~.

3. (Currently amended) ~~Transfection vector~~ The composition according to Claim 1 or Claim 2, wherein the polymeric sequence of the basic amino acids comprises between 10 and 50 amino acid residues, selected from the group consisting of lysine, arginine and ornithine.

4. (Currently amended) ~~Transfection vector~~ The composition according to claim 1 or 2, wherein the cationic polymeric sequence is selected from the group consisting of polymeric amines.

5. (Currently amended) ~~Transfection vector~~ The composition according to claim 1 or 2, wherein the NLS sequence is at the N-terminal end of the transfecting peptide and the polymeric sequence of basic amino acids is at the C-terminal end of the said transfecting peptide.

6. (Currently amended) ~~Transfection vector~~ The composition according to claims 1 or 2, wherein, when

the chemical substance is a nucleic acid, the transfecting peptide/nucleic acid ratio is between 0.3:1 and 15:1~~, preferably between 2:1 and 6:1~~.

7. (Currently amended) ~~Transfection vector~~ The composition according to claims 1 or 2, combined with a targeting ligand.

8. (Currently amended) A composition consisting essentially, in addition to the said chemical substance and to at least one ~~of a~~ transfection vector according to claim 1 or 2, of ~~and~~ a suitable vehicle selected from the group consisting of bile salts, antiproteases, cyclodextrins and derivatives thereof, antiseptics and polyols.

9. (Currently amended) A method of transfecting eukaryotic cells *in vitro* with a chemical substance selected from the group consisting of nucleic acid sequences, proteins, peptides and pharmacologically active chemical substances, characterized in that it comprises the bringing into contact and the incubation of a ~~transfection vector~~ composition according to claim 1 or 2 in a dilution buffer comprising 100 - 150 mM NaCl with eukaryotic cells for 15 to 120 minutes at room temperature, the chemical substance to be transfected:transfecting peptide ratio being between 0.3:1 and 15:1 ~~, preferably between 2:1 and 6:1, preferably between 4:1 and 6:1~~.

10. (Currently amended) ~~Peptide vector~~ A composition for transfecting a chemical substance selected from the

group consisting of nucleic acid sequences, proteins, peptides and pharmacologically active chemical substances, containing, in addition to the said chemical substance, at least one transfecting peptide which comprises:

- a segment of an NLS sequence consisting of sequence ID NO:2,
- a segment of a sequence consisting of sequence ID NO:10,
- a segment of a sequence consisting of sequence ID NO:16, and
- a polylysine.

11. (New) A composition according to Claim 1 or Claim 2, wherein X_1 and/or X_2 represents a sequence of 5 to 15 amino acids.

12. (New) A composition according to Claim 6 wherein the transfecting peptide/nucleic acid ration is between 2:1 and 6:1.

13. (New) A method according to Claim 9 wherein the ratio of substance to be transfected:transfecting peptide is between 2:1 and 6:1.

14. (New) A method according to Claim 9 wherein the ratio of substance to be transfected:transfecting peptide is between 4:1 and 6:1.